ning ſtruck Mr. Blanchard's houſe, in third ſtreet. This is a three ſtory houſe, having two ſtacks of chimneys, Eaſt and Weſt of each other one on each ſide of the higheſt part of the roof. Several bricks were thrown off one corner of the weſtermoſt ſtack. The lightning is ſuppoſed to have come down a wooden rod, furniſhed with an iron ſpindle and vane, the whole about fourteen feet in length which ſtood by the ſide of this chimney top, though no marks of it are viſible on the rod. From near the foot of this rod it proceeded down a rafter on the Eaſt ſide of the roof, ſplitting it through its whole length, and breaking up the ſhingles over it. From the foot of this rafter it proceeded quietly down a copper ſpout without injuring the building or leaving any other traces on it.

N°. XV.

An Account of the effects of a ſtroke of Lightning on a Houſe furniſhed with two Conductors,—in a Letter from Meſſrs. DAVID RITTENHOUSE *and* FRANCIS HOPKINSON; *to Mr.* R. PATTERSON.

Read Oct. 15, 1790.

ON Tueſday evening, the 17th of Auguſt, 1789, the dwelling houſe of Mr. Thomas Leiper, at his Mills, near Cheſter, was ſtruck by lightning. As this is a remarkable caſe, the houſe being furniſhed with two good conductors, Mr. Leiper requeſted us to view the ſituation of the building and the effects of the lightning, which we did three days after the accident.

The houſe ſtands at the foot of a pretty ſteep aſcent, on the Weſt ſide of Crum creek, and within a few yards of the mill dam. It is a regular ſtone building 36 feet by 32, two ſtories high at the Weſt end, above ground, and three

three ſtories at the Eaſt end. At each end there are two ſtacks of chimnies, which riſe from the roof about half way between the eaves and the ridge. The pointed conductors, one at each end, are faſtened to the two moſt Southerly chimnies, and are brought directly down the outſide of the wall to the ground, which they enter probably but a few feet, on account of the rock. The rods are well made the pieces being ſcrewed together and not connected by hooks.

The cloud which diſcharged the lightning came from the Weſt, and the fluid appears to have proceeded down the Weſtern conductor, at leaſt in part, for the point is melted down to a conſiderable thickneſs. The next perceptible effect of it is on the South ſide of the ſame chimney, where it has torn up the ſhingles of the roof nearly 18 inches in breadth, from the chimney directly down to a water gutter, covered with copper, which runs along the roof from Weſt to Eaſt a foot above the eaves, and at the Eaſt end is connected with a copper ſpout which comes directly down along the wall, within four feet of the earth, where it diſcharges the rain water into a cedar tub, bound with iron hoops.

The lightning appears to have paſſed quietly along the copper, the whole length of the gutter and ſpout. About a hands breadth below the end of the ſpout it tore off and ſhivered in pieces an inch board, which paſſed down between the ſpout and the wall and had been lower down than the ſpout, partly paſſing into the tub, it made its way through to the outſide, and thence into the earth, throwing off many ſmall ſplinters from different ſides of the tub.

Another part of the lightning appears to have proceeded along the Weſtern rod until it came directly oppoſite to the copper gutter, from which it is diſtant 6 or 7 feet: it then ran along the corniſh, part of which it threw off in

its courſe, to the end of the gutter, where it united with that part firſt mentioned. That ſome part was diſcharged into the earth by this conductor is evident, for the ſurface of the earth was thrown up at the foot of it.

Immediately Weſtward from the houſe the garden riſes pretty ſteep, ſo that at the diſtance of leſs than 20 rods the ſurface of the ground is higher than the chimney tops, and immediately adjoining is a grove of oaks and other trees, of the uſual height.

It may ſeem extraordinary that the electric fluid was not diſcharged through ſome of thoſe trees, which are ſo much higher than the houſe, and over the tops of which the cloud muſt have paſſed before it reached the houſe. But perhaps, on account of the vicinity of the water, the houſe, with its conductors, including the copper ſpout, afforded a more ready conveyance. The hill, Weſt of the houſe is one continued rock, covered with a few feet, or rather inches of earth. The rock is probably but a bad conductor, and the earth on its ſurface pretty dry, for it had not yet rained at that time. Had the earth been ſufficiently moiſt at the foot of the conductor, it is likely we ſhould not have ſeen any effects of the lightning.

This caſe ſeems to give ſome force to an objection made long ago to the uſe of pointed rods. That is, that they may ſometimes invite a diſcharge of the electric matter, which would otherwiſe have paſſed elſewhere, and which they are nevertheleſs inſufficient to convey, without injury to the building. But it is by no means certain that the houſe would have eſcaped had it not been furniſhed with rods; for we very often ſee the lightning ſtrike low trees and buildings in the neighbourhood of others much higher; and, beſides, had not the copper gutter and ſpout furniſhed ſuch an excellent conductor, the fluid might have paſſed quietly through one or both of the rods. But by whatever means the diſcharge was promoted in that particular manner, the damage done to the building was trifling,

ling, and no part of the inſide ſuffered in the leaſt, notwithſtanding that the ſtroke, by the prodigious noiſe which accompanied it, ſeemed to be very powerful.

It is remarkable that a perſon was ſitting at the time in a door on the ground floor, not more than 4 feet from the lower end of the copper ſpout, who received no injury, though he very ſenſibly felt the ſhock.

From our obſervations on the above caſe, as well as ſome others that have occurred, we would ſtrongly recommend to thoſe who put up pointed rods, that the lower end be ſunk ſufficiently deep to reach moiſt earth in the dryeſt ſeaſons. And we ſubmit it to thoſe converſant with electrical philoſophy, whether, when there are more rods than one to a building, it might not conduce much to its ſafety to form a good communication between the rods, and likewiſe between them and a copper water ſpout; carrying an iron or copper rod from the lower end of the ſpout a ſufficient depth into the ground.

Thinking it poſſible that the above may afford ſome hints for improving the means, now pretty generally in uſe, for guarding againſt the fatal effects of thunder ſtorms, we have thought proper to lay it before the Society, and ſhall be happy if it receives their approbation.

N°. XVI.

Experiments and Obſervations on Evaporation in cold Air, by C. WISTAR, M. D.

Read Sept. 21 1787. DURING an experiment with a frigorific mixture, I frequently had occaſion to introduce my hand when it was wet, into a cold veſſel, and obſerved that while it was in this ſituation, a ſmoke or viſible vapour aroſe from the moiſture on it, which ceaſed when it was withdrawn into warmer air, and returned upon my replacing it in the veſſel. In